

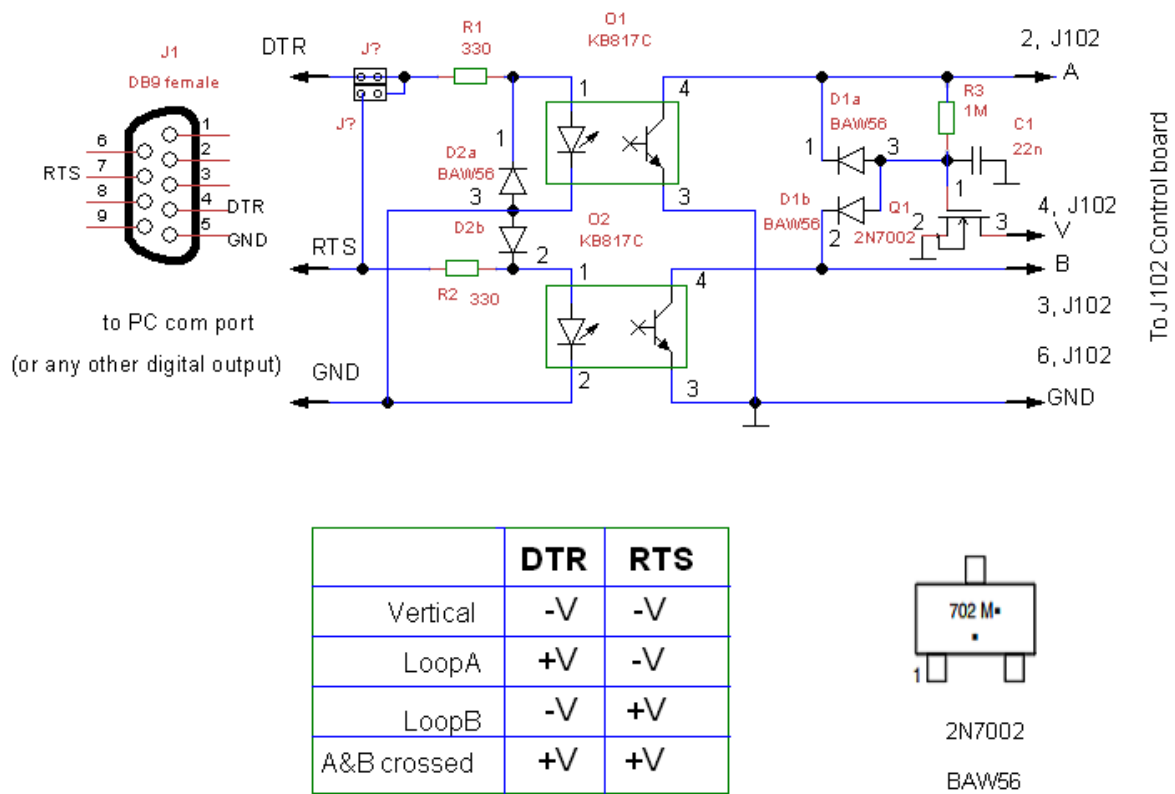
## PC control of AAA-1 active antenna

Rev.1.0 Dec 2016

It is possible to control the modes of AAA-1 from the PC. It is convenient to have such an option e.g. if you have a remote station there must be way to switch the antenna modes via software. The standard COM port can be used for this purpose. There are two digital outputs of the COM port which are used - RTS and DTR. The user must build a very simple additional interface board and to use the applied software.

### 1. Interface board

**Fig. 1** shows a schematics of the interface which will work with all models AAA-1, AAA-1B, AAA-1C.



**Fig. 1** Schematics of the interface board for all models. Only for AAA-1C model: D1,Q1,R3,C1 may not be mounted and the V terminal might be left open (pin 4, J103 of Control board).

Optocouplers are used to avoid direct connections of the PC common point and outputs to highly sensitive RF device such as AAA-1. The schematics is shown with SMD components but digital level mosfet e.g. BS170 and other non-smd components can be used. KB817C is a low cost 4 pin optocoupler ; at +5 V RS232 level  $I_f=11\text{ mA}$  ,  $U_f=1.2\text{ V}$  ;  $U_{ce}=0.5\text{ V}$  @  $I_c=10\text{ mA}$ . Popular CNY17-4

can be used also. There is a jumper J which is used to connect together RTS and DTR lines ( on the interface board not on COM port) and connect them either to RTS or DTR terminals of the PC COM port - thus using only one output. In this way using only single control line we can set AAA-1 either in Crossed loop (X) mode or Dipole mode.

This interface does not use TXd and RXd terminals of the COM port. The user can use them for other software e.g. for transceiver CAT control. Use VSP software [1] to create virtual com-port connected to this physical comport in order to enable several programs to use the same COM port. The AAA-1 software will use DTR and RTS lines and the CAT software will use TXd and RXd lines.

*Remark for users of AAA-1C :* the AAA-1C amplifier board has an internal decoder for Dipole mode ( A=B= open). D1,Q1,R3,C1 may not be mounted and the V terminal might be left open (pin 4, J103 of Control board). The FTP wire connected to pin 4, J1 (RJ45) is free. It is not connected to any point of AAA-1C. For this model the control circuit of Fig.1 can work in parallel with mechanical switches keyboard. The only requirement is that the inactive part must be in dipole mode (A,B lines open).

## 2. Open Source Software for Controlling AAA-1 from PC Com-Port

V.1. 1 Nov 2016 All OS versions. Project published in <https://github.com/potty-dzmeia/AaaController>

The control program is deliberately written in Java in order to work on several operating systems. The program works with any COM port ( also with USB-RS232 adapters which have RTS and DTR terminals). The current version can be loaded from <http://active-antenna.eu/variable-delay-line-kit-vdl-1a/technical-documentation/> or from design site <https://github.com/potty-dzmeia/AaaController> where the last version is always available. It is open source. The program should support the following operating systems: win32, win64, linux\_x86, linux\_x86\_64, linux\_ia64, mac\_os\_x  
Tested in: Win XP, 7 (32&64bit) , 8 (32&64bit), Win 10 and Linux Debian.

### 2.1 Installation

In any OS:

- Make sure you have installed Java Runtime Environment (JRE) version 1.7 or later.

<https://www.java.com/en/download/>

- Unzip the distribution software in any folder and drive. A new folder is created named **aaacontroller-xxxx** where xxxx is the version number.
- To start the program double-click on the file *startup.bat*

### 2.2 Main window

After first start the main window looks like Fig.1. Clicking on any of the buttons will choose the appropriate mode. The current state of RTS and DTR lines will appear at the lower edge. The window can be resized – keep it small not to occupy large part of the screen. *Periodic switching* - mark the checkbox to initiate the periodic switching mode.

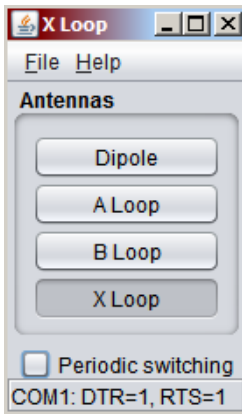


Fig.1 Main window

### 2.3 File menu Settings window

- *CommPort* - choose the appropriate COM port name.
- *Virtual CommPort* - File name of a virtual COM port . Leave empty in Windows. Used in Linux.
- *Button labels*: any names can be entered but the default are those shown on Fig.1 which correspond to AAA-1 modes.
- *Save* – to activate current settings click on the Save button.

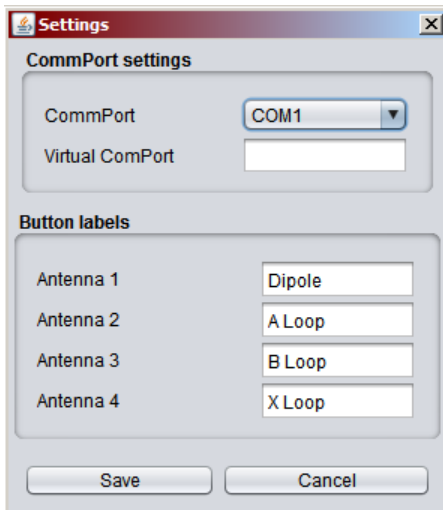


Fig. 2 Settings window

### 2.4 Periodic Switching of modes

In this mode (Fig.3) a periodical selection of antenna modes is performed. From the checkboxes the user can select which antenna modes are switched. The time duration of mode can be set by entering a millisecond value inside the Text Fields. The *Periodic Switching* window and the *Main* window can be opened simultaneously and the user can change interactively the periodic switching parameters and modes. Any change in *Periodic Switching* window values must be followed by pressing the *Set* key in order to make them effective.

The periodic switching can be used to test and estimate the antenna performance especially to compare the AAA-1 different antenna modes, with real sky signals in the presence of fading. For this purpose an SDR receiver and Linrad program must be used. See the article *A Periodic Switching Technique to Compare Antenna Performance in the Presence of Strong Fading*.  
<http://www.lz1aq.signacor.com/docs/antenna-performance/switching-technique-compare-receiving-antenna-performance.htm>

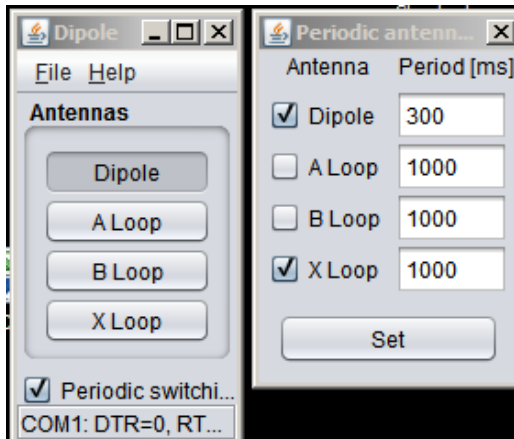


Fig.3 Periodic switching. Here the Dipole and XLoop modes will be toggled periodically. Dipole will be active 300 ms and Xloop - 1000 ms.

## 2.5 Other applications

This program can be used as a versatile software which controls RTS and DTR lines. For example, the user can use these two lines to control antenna switch with relays for 4 antennas (with additional simple decoder). Appropriate names for the buttons can be entered in the setup menu.